in the last two columns based on all the rainfall data for the twenty-five years.

Melted snow is included with rain.

Month.	1892 1893	1893 1894	1894 1895	1895 1896	1896 1897	1897 1898	1898 1899	1899 1900
	in.	in.	in.	in.	in.	in.	in.	in.
July	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00
August	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.12
September ..	0.24	0.48	1.64	0.08	0.47	0.07	0.29	0.00
October	1.38	0.66	2.98	0.78	1.85	1.25	1.33	6.37
November ...	10.30	4.01	0.84	2.46	5.86	1.51	1.23	4.92
December ...	5.56	3.58	11.90	3.16	4.91	2.70	2.13	4.16
January	3.29	9.74	10.00	9.54	3.50	2.30	5.63	3.26
February	3.45	10.52	3.08	1.08	7.42	4.16	0.75	1.70
March	8.99	2.54	1.46	3.83	6.45	2.04	11.11	3.37
April	3.61	0.89	2.30	6.70	0.82	0.84	1.40	4.06
May	0.95	2.78	2.39	2.10	0.28	2.41	1.47	1.35
June	0.16	0.64	0.00	0.02	0.38	0.38	0.39	0.00
Annual	37.93	35.84	36.61	29.76	32.22	17.66	25.73	29.31

Month.	1900 1901	1901 1902	1902 1903	1903 1904	1904 1905	25-year Mean.	Mean Sum to End of Month.
	in.	in.	in	in.	in.	in.	in.
July	0.01	0.00	0.00	0.00	0.00	0.00	0.00
August	0.02	0.05	0.00	0.00	0.05	0.03	0.03
September ..	0.08	1.08	0.00	0.00	2.33	0.41	0.44
October	3.48	2.19	2.09	0.47	2.51	1.82	2.26
November ...	7.76	2.89	3.01	7.69	2.05	3.01	5.27
December ...	2.21	1.61	3.11	1.39	3.84	6.53	11.80
January	5.76	1.44	8.86	1.98	4.04	4.67	16.47
February	5.92	9.15	2.20	9.53	3.89	4.72	21.19
March	1.98	5.18	9.89	8.06	5.91	5.39	26.58
April	3.33	2.60	1.12	4.38	1.36	3.11	29.69
May	1.07	1.19	0.05	0.45	2.27	1.63	31.32
June	0.02	0.00	0.00	0.03	0.00	0.38	31.70
Annual	31.64	27.38	30.33	33.98	28.25	31.70	

January 22, 1906. JAMES D. MADDRILL.

A DOUBLE-STAR PROBLEM.

BURNHAM has called 95 *Ceti* (= ALVAN CLARK 2) "the most mysterious and strange double star in the heavens. I have tried it," he says, "first and last, perhaps hundreds of times with apertures all the way from 6 to 36 inches without

being able to see any trace of the little star." He did, however, measure it on two nights in 1888.

My own experience confirms BURNHAM'S estimate of the mysterious nature of this system, and it is one object of the present note to add another chapter to its history. My second object is to show that this star is not in a class by itself by giving some observations of three other stars, two, at least, of which present very similar difficulties to those encountered in the attempt to harmonize the observations of 95 *Ceti*.

These three stars are 80 *Tauri* (= Σ 554), *Draconis* 205 (= β 971), and β 163 (Ll.41386); and my recent measures of them and of 95 *Ceti* are:—

95 *Ceti*.

Date.	Angle.	Distance.	Magnitudes.		Telescope.
1898.15	136°.7	0″.51	6—9	2ⁿ	12-inch and 36-inch

1900 and 1901. Companion not seen on four nights with the 36-inch telescope, the seeing being very good.

1904.93. Companion invisible with 36-inch telescope. Seeing good. 2ⁿ.

1906.014	166°.6	0″.48	6—9+	1ⁿ	36-inch

Σ 554.

1904.9. Star round on many nights and no companion seen with 36-inch. Special pains taken because of Professor HUSSEY'S discovery of a difficult pair near by (See Hu. 1080). Professor HUSSEY, too, could see no companion to Σ 554.

1905.994	44°.9	0″.57	6—9	36-inch	Seeing 3
1906.014	38 .0	0 .55	6—9	36-inch	Seeing 4

β 971.

1900.749	8°.0	0″.37	6.5—9	36-inch	1ⁿ	Seeing 3
1902.315	29 .3	0 .34	6.0—9.5	36-inch	1	Seeing 2+

1904.44[1] Star single. Powers to 1500 on 36-inch. Several good nights.

1905.288	36 .6	0 .37	6—9	36-inch	Seeing 2+

1905.458 to 1905.751. Star single on four good nights. 36-inch.

[1] Professor HUSSEY also found this star single in 1904 with the 36-inch telescope.

β 163.

1898.74 253°.2 0″.63 7—9.6 12-inch 3^{n}

1905, July and August. No companion seen with the 36-inch on many nights—some of them excellent. Star identified with certainty, and on one good night all neighboring stars to the magnitude 9.0 carefully examined.

95 *Ceti* was discovered by ALVAN CLARK in 1853 with a 7½-inch refractor, and was first measured by DAWES in 1854. The positive measures to date are:—

1854.80	71°.9	0″.73±	DAWES (3 nights).
1888.77	112 .8	0 .45	BURNHAM (2 nights).
1897.83	147 .8	0 .46	SEE and BOOTHROYD (1 night).
1898.15	136 .7	0 .51	AITKEN (2 nights).
1899.82	157 .0	0 .35	SEE (2 nights).
1906.01	166 .6	0 .48	AITKEN (1 night).

80 *Tauri* was first measured by STRUVE in 1831, the mean of four nights' measures being 12°.9 and 1″.74. The measures of the next thirty years indicated only very slow motion, DEMBOWSKI in 1862 obtaining 9°.6 and 1″.13 from four nights' measures. But when BURNHAM measured it in 1878 the distance had diminished to 0″.58, with hardly any change in the angle. This is the last measure published. After this time no one seems to have examined the star until 1890, when BURNHAM failed to see the companion with the 36-inch telescope. Since then many attempts have been made to observe the companion with the same telescope, but all without success until my two very recent measures.

In his General Catalogue of his own discoveries BURNHAM gives all the measures of β 971 and β 163 to 1899. The following are sufficient to show the history of these stars:—

β 971.

1879.88	354°.7	0″.54	6.5—8.5	2^{n}	BURNHAM.
1891.48	4 .5	0 .36	6.8—9.2	3	"
1893.54	107 .0	0 .25±	.....	2	LEAVENWORTH.
1894.61	Single 36-inch		.....	2	BARNARD.
1897.43	11 .6	0 .30	.....	1	LEWIS.
1898.70	5 .2	0 .36	6.5—9.0	1	AITKEN.

β 163.

1876.09	252°.3	1″.15	7.1 — 9.0	4[n]	DEMBOWSKI.
1891.52	254 .6	0 .75	7.2 — 9.8	3	BURNHAM.
1895.46	251 .9	0 .56	.....	5	SCHIAPARELLI.

It will be noted that the four systems are similar in point of the relative magnitudes of their components, and, in a general way, in point of their angular separation (excluding the early measures of Σ 554 and of β 163). If we had to deal with only one star, or one observer, or one telescope, it would not be difficult to suggest plausible explanations for the negative results. As it is, it seems hardly credible that the failures to see the fainter stars can be due to poor seeing. In my own case my records show that other close and unequal pairs, including some exceedingly difficult ones, were measured on the nights when negative results were obtained for the four named. Nor does it seem at all possible, except perhaps in the case of β 163, that the angular separation of these pairs was too small to permit the companion to be seen on so many different dates. The positive measures seem to exclude this explanation.

Of course, we may fall back upon the hypothesis of variability in the light of the companion-star; but one hesitates to advance that explanation in the absence of any positive observations of variability. There seems to be no reason in the nature of things why the component of a binary system should not be variable as well as any single star, but it has too often proved in the past that the suspected variability of a double star has been due simply to poor seeing or to a poor telescope. For the present, therefore, the problem remains, and adds to the interest of these systems.

R. G. AITKEN.

January, 1906.

SOME TESTS OF THE SNOW TELESCOPE.[1]

In the preliminary tests of the Snow telescope at the Yerkes Observatory, the results were rather disappointing, though good images were occasionally obtained. It was evident that difficulty might be expected from the distortion of the mirrors

[1] Abstract of *Contributions from the Solar Observatory*, No. 4.